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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/615,233
Filing Date: July 13, 2000
Appellant(s): KASAI ET AL.

MARK A. DODD
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 6/28/2004.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that all claims stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

The following ground(s) of rejection are applicable to the appealed claims:

5,601,352	OKAMURA	2-1997
6,185,045	HANNO	2-2001
5,537,092	SUZUKI ET AL.	7-1996
6,150,998	TRAVERS ET AL.	11-2000

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 U.S.C. § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:
A person shall be entitled to a patent unless --
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 7-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Okamura (5601352).

As in claim 1, Okamura teaches of a head-mounted image display apparatus comprising: an image display element, **figure 4 item 3-5**; a projection optical system that projects an image displayed by said image display element, **figure 4 item 6 (in particular) figure 4 items 14 (in general)**; a screen on which the image projected by said projection optical system is formed, **figure 4 item 7**; and a combiner disposed between said projection optical system and said screen, **figure 4 item 15**, wherein said

combiner transmits image light and directs it to said screen, and reflects the image light reflected at the screen, **figure 4 item 15**, while simultaneously transmitting external light, **column 6 lines 42-60**. Wherein the half mirror is equivalent to the combiner and it lets in external light so the observer can see the LCD image as well as the outside environment. The screen 7 is also a reflective mirror on which the image is formed as is known for all mirrors. The screen 7 also reflects the projected LCD image to the observers eyes via the half mirror.

As in claim 3, Okamura teaches wherein said screen is disposed above or below a user's pupil, figure 4 item 7.

As in claims 7 and 8, Okamura teaches wherein said image display apparatus has a plurality of units each including said image display element and said projection optical system, figure 4 items 3-5, and figure 6 items 16a and 16b.

As in claim 9, Okamura teaches wherein said screen has a retro reflection characteristic, figure 4 item 7.

As in claim 10, Okamura teaches wherein said combiner is a half mirror or a polarization separation member, figure 4 item 15, column 6 lines 4260.

As in claim 11, Okamura teaches of a head-mounted image display apparatus comprising: an image display element, **figure 4 item 3-5**; a projection optical system that projects an image displayed by said image display element, **figure 4 item 6 (in particular) figure 4 items 14 (in general)**; a screen on which the image projected by said projection optical system is formed, **figure 4 item 7**; and a combiner that reflects image light reflected at said screen, and simultaneously transmits external light, **figure 4 item 15, column 6 lines 42-60**. Wherein external light enters and leaves the system via shutter 16 of figure 4 while the system is in operation, such that the combiner or half mirror 15 also receives external light.

As in claim 12, Okamura teaches wherein said combiner further transmits image light from said projection optical system and directs it to said screen, column 6 lines 42-60.

Claim Rejections - 35 U.S.C. § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okamura (5601352) in view of Hanano (6185045).

As in claim 4-6, Okamura is silent as to further comprising an eyepiece optical system disposed between said combiner and the user, wherein said eyepiece optical system enlarges the image projected onto said screen, and an optical element disposed on an external side of said combiner with respect to said eyepiece optical system, said system having a composite optical power of substantially zero. **Hanano teaches of** said eyepiece, figure 9 item 13, and Okamura teaches of said external optical element, figure 4 item 16. As illustrated by the image display devices in Okamura, figure 4, and Hanano, figure 9, both devices assigned to the same assignee, Olympus Optical Co., Ltd, they teaches of like systems who's features would be interchangeably and readily combinable by the skilled artisan wherein the eyepiece of Hanano could be added to the head mounted image display apparatus of Okamura to enhanced the system based on known features on a like device, wherein given that external images or light can be seen through the device optical system with no additional optical power, thereby viewing the computer generated video superimposed onto the real world environment, said system inherently has an optical power close to zero, for the purpose of having no strain on the eye while viewing real and generated images simultaneously. In optics parallel light is said to have zero optical power. As shown in figure 9, Hanano teaches of parallel light reaching the Eyeball.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okamura (5601352) in view of Hanano (6185045), further in view of Travers et al. (6150998) and Suzuki et al. (5537092).

As in claim 13, Okamura teaches of a head piece adapted to be worn on a head of a wearer, the head of the wearer having a face, the head piece, figure 7, comprising: a hood, said hood adapted to be positioned on the had of the wearer, figure 7; a visor having a first end and a second end, said first end of said visor rotateably mounted to said hood such that said visor rotates from a first position, substantially covering the face of the wearer, to second position not substantially covering the face of the `Nearer, figure 7 item 13, wherein said visor inherently teaches of said first and second positions for allowing said hood to be fit one said wearers head; an image display apparatus comprising: an image display element, figure 4 item 3-5; a projection optical system that projects an image displayed by said image display element, figure 4 item 6; a screen onto which the image is projected by said projection optical system is formed, figure 4 item 7; and a combiner that reflects image light reflected at said screen, and transmits external light, figure 4 item 15, column 6 lines 42-60, an optical element disposed on an external side of said combiner with respect to said eyepiece optical system, figure 4 item 16. However Okamura is silent as to said eyepiece in conjunction with said optical element to produce an optical power of zero, as well as said image display apparatus being positioned substantially at said second end. Okamura in view of Hanano teaches of said eyepiece in conjunction with said optical element for the same reasons of obviousness as applied to claims 4-6 above. Travers et al. teaches of a headset for the purpose of visual display that would be readily available to the skilled artisan for use in Head Mounted Display devices of Okamura in view of Hanano, given said headset

represents a design choice known in the art and useful for implementing Head Mounted Display systems, figure 6.. Adding the headset of Travers et al. to the system of Okamura in view of Hanano would produce the system as claimed with the exception of said image display being placed closer to said first rotatable end. However place the image display below eye level making it closer to said second end would be an obvious design choice given such systems are known to be of use in Head Mounted Display systems.. Suzuki et al. illustrates such a system wherein said image display is below eye level, figures 3, 7, & 8. Therefore it would have been obvious to the skilled artisan at the time of the invention to combine the hood features of Travers and Suzuki to the Head Mounted Display optical system of Okumara in view of Hanano for the purpose of achieving an enhanced display, because both Travers and Suzuki suggest said features are useful in such systems, as found in claim 13.

(11) Response to Argument

ISSUE # 1 - Applicant argues the element figure 4 item 6 of Okamura is not a projecting element and the image of the system is not formed on the screen element figure 4 item 7 of Okamura.

First the image display device as designed by Okamura would could not function properly if it did not provide a projection system to project the image formed by the LCD element to the observers eyes. As shown in figure 4 of Okamura the LCD's 3-4 are

fixed within the display system such that the image is facing a downward or southern direction. The observers eyes are disposed within the display system to see images directly westward or images in the plane of the users eyes directly in front of it. Therefore without a projection system the images from the LCD would never meet with the observers eyes and the device would therefore fail to function properly. Therefore Okamura must teach of a projection system.

Second the diffusion plate which makes up part of the projection system is described on column 4 lines 31-39 as a "luminous flux diffusion optical system". An optical system is defined as a system that projects an image. The Appellant argues that scattering is not consistent with projection, however while this point is irrelevant, it is false, given the fact that scattered light is also projected light by definition.

Third the Appellant contradicts its assertion by stating on the last line of the second full paragraph of page 5, "the image projected by Okamura's image display element". Therefore the Appellant admits that Okamura does in fact project and image, and therefore Okamura must have "a projection optical system that projects an image displayed by said image display element". The Examiner asserts that said projection optical system is figure 4 item 6 in particular and figure 4 item 14 in general.

Fourth, the screen 7 taught by Okamura is an ocular lens having a reflective property as also taught by the Appellant on pages 6 and 9 of the specification. The screen 7 taught

by Okamura functions identical to the screen taught by the Appellant, having reflective properties. As know with mirrors, an image is formed on its surface which is also reflected. Okamura teaches of the image of the LCD being projected to the screen 7 and therefrom being reflected to the observers eyes via the half mirror. Therefore the Examiner asserts the image is formed on the screen 7 of Okamura as claimed.

ISSUE # 2 – Appellant argues the combination of Okamura and Hanano fails to teach of wherein a composite optical power of said eyepiece optical system and said optical element is substantially zero.

First the prior art by Okamura and Hanano owned by the same assignee, Olympus Optical Co., are both drawn to Head Mounted Display Systems whose features are directly related to each others invention given they belong to the identical subclass of prior art. The motivation to combine the features of the two inventions lies in their attempt of solve the same problem of providing an enhanced Head Mounted Display. Further both Okamura and Hanano teach of systems containing the same elements: a image display device (LCD), a half mirror, and a reflective screen/mirror. They teach of like systems who's features would be interchangeable and readily combinable by the skilled artisan, wherein the eyepiece of Hanano could be added to the head mounted image display apparatus of Okamura to enhance the system based on known features on a like device.

Second, given that images or light can be seen through the devices optical system with no additional optical power (in optics parallel light is said to have zero optical power) such that an image in superimposed onto the real world, the system inherently has an optical power substantially zero. This allows a person to reduce eye strain while viewing both images simultaneously. The Appellant argues there is not disclosure or suggestion that the composite optical power of the trapezoidal optical element 13 of Hanano and the shutter 16 of Okamura is substantially zero however the Examiner disagrees because the shutter 16 by function has zero power given it serves to let in the external light to be viewed simultaneously with the computer image. Therefore its addition or combination with the optical element 13 of Hanano has an inconsequential effect on power. Further given the need to view the external environment with the projected image simultaneously the optical element 13 of Hanano, column 32 lines 40-65, will be distributing parallel light which is known to have zero power. Therefore the combination of Okamura and Hanano teaches of wherein a composite optical power of said eyepiece optical system and said optical element is substantially zero as claimed.

ISSUSE # 3 – Appellant argues the combination of Okamura, Hanano, Travers and Suzuki fails to teach of said invention as found in claim 13.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention

where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Okamura in view of Hanano are combined based on the knowledge generally available to one of ordinary skill in the art as argued in reference to claims 4-6 above. Further Travers et al. teaches of a headset for the purpose of visual display that would be readily available to the skilled artisan for use in the device of Okumura in view of Hanano, given the headset solves the same problem of providing a useful heads mounted display. Suzuki et al. represents a known method of providing the optical projection system for a head mounted display below the users eyes as a design choice available to the skilled artisan.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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